Staff Report

TRIM: 2015AKL84

August 3, 2015

STAFF REPORT

To: June Bergquist
File

Cc:

From: Robert Steed, Surface Water Ecologist

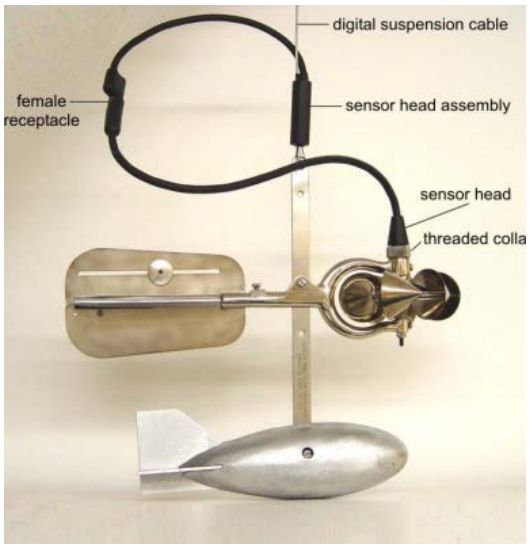
Subject: Pend Oreille River Flow Measurements.

Introduction

June Bergquist requested that velocity (e.g. meters/second) measurements be taken of the water in the vicinity of Sandpoint's outfall and on the river side of the Long Bridge (thalweg) during July/August timeframe. A Cormix model has been run and estimated these values but real data would be better. The outfall extends 925 feet into the river perpendicular to the bank at the Sandpoint Waste Water Treatment Plant (WWTP) location so you can approximate where the end is located.

Measurements

On August 3, 2015 R. Steed and C. Nelson took the 21' DEQ boat to Pend Oreille River to take these measurements. A Teledyne Gurley 622DE flow meter (see example image on right) was utilized and readings were displayed on Teledyne Gurley Model 1100 Digital Flow Velocity Indicator. The meter was lowered over the side of the boat with a hand line, fixed, and then measurements were taken. Depths of meter were established with a fiberglass measuring tape. The boat was firmly anchored both with a stern anchor and a bow anchor to minimize drift. Measurements were taken at 20% and 80% of the station depth and recorded separately. The flow meter was observed with a view tube to determine flow direction.



A transect, observing water depth, was conducted from the WWTP to the opposite shore. The depth of the river was between 14.0 and 14.9 feet for 95% of the length, until a channel was observed near the south shore. The second station was from this channel and is believed to represent the thalweg. The channel was up to 23 ft deep.

August 3rd, 2015 was a hazy day due to fires in Washington. Wind was blowing due east at force 3 to 4 (Beaufort scale). 3 to 4 is a gusty wind speed of 8-11 mph constant and gusts in the range of 12-18 mph. Input flows into Pend Oreille Lake from the Clark Fork River were approximately 5720 cfs

which is lower than the lowest recorded flow of 6320 cfs in 2007. Mean and Median flows for Clark Fork River are 15,400 and 14,300 cfs respectively.

The tables and diagram below show the results of the monitoring effort.

Station	Latitude	Longitude	Stn Depth (ft)	Location
1	48.26163	-116.5592	13.7	Proximal to WWTP outlet

Sub-Station	Measurement Depth (ft)	Flow Direction (True North)	Flow Velocity (cfs)	Notes:
1-20%	2.7	N18°E	0.2-0.5	
1-80%	11.0	-not taken-	0.2-0.5	Could not see direction at 11 feet.

Station	Latitude	Longitude	Stn Depth (ft)	Location
2	48.23918	-116.55803	20.0	Deepest location from transect across river from WWTP

Sub-Station	Measurement Depth (ft)	Flow Direction (True North)	Flow Velocity (cfs)	Notes:
2-20%	4.0	S25°W	0.5	
2-80%	16.0	S40°W	0.5	

Station	Latitude	Longitude	Stn Depth (ft)	Location
3	48.250561	-116.55852	14.1	Midpoint between Station 1 and Station 2

Sub-Station	Measurement Depth (ft)	Flow Direction (True North)	Flow Velocity (cfs)	Notes:
3-20%	2.8	N90°E	0.5	
3-80%	11.3	S5°W	0.2	

Station	Latitude	Longitude	Stn Depth (ft)	Location
4	4825724	-116.58193	10.7	Downstream end of proposed mixing zone.

Sub-Station	Measurement Depth (ft)	Flow Direction (True North)	Flow Velocity (cfs)	Notes:
4-20%	2.1	S72E	0.2-0.5	
4-80%	8.6	-not taken-	0.2	Could not see direction at 11 feet.

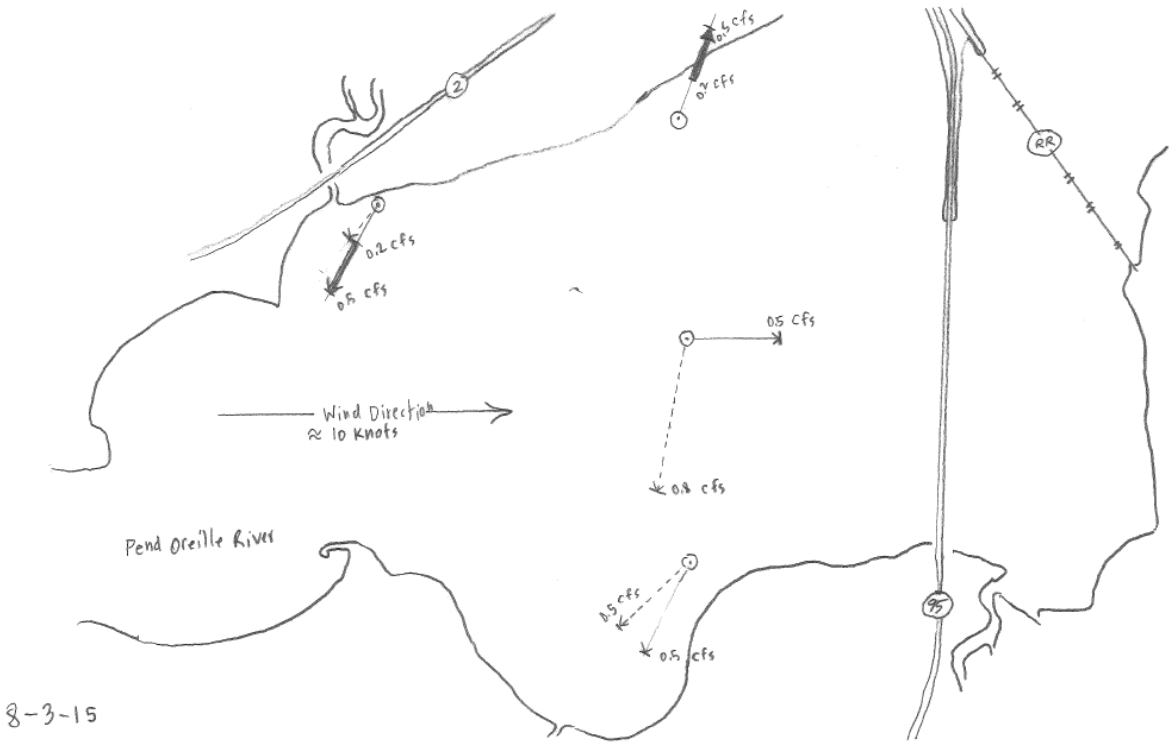


Figure 1. Measurement locations and vectors representing flow velocity and direction. Note that flow values are in ft/sec rather than cfs as depicted.

Discussion

It appears that most of the current (flow) in this section of the Pend Oreille River on days like Aug 3, 2015 are quiescent or affected of wind action. Unfortunately the instrument recorded stepped values (0.0, 0.2, 0.5, and 0.8) at such low current conditions, and meters with more resolution should be sought for additional monitoring. Boat rocking may have affected flow measurements; we observed higher flow at stations when the boat was rocking from wind waves and other boat wakes. We attempted to only record values when the boat was flat for a period of time. No current was observed at the surface of buoys, pilings and docks along the entire northern shore, the spit, or either of the bridges.